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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/586,347

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Mats Hedman

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YOUNG & THOMPSON

209 Madison Street

Suite 500

ALEXANDRIA, VA 22314

EXAMINER

VILAKAZI, SIZO BINDA

ART UNIT

PAPER NUMBER

3747

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/586,347	HEDMAN, MATS	
	<b>Examiner</b>	<b>Art Unit</b>	
	SIZO B. VILAKAZI	3747	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 September 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1-5, 10, 12-14, 16, 18, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Jepsen (US Patent 4,322,950).

3. In re Claims 1-5, 10, 13, 14, 16, and 18, Jepsen discloses a method of compressing a medium in the combustion chamber of a combustion engine, comprising introducing a liquid, in the state of a spray, into the compression chamber during a compression stroke, and the liquid is pressurized and heated before it is introduced into the compression chamber to such a degree that at least a part of the droplets of the spray explode spontaneously upon entrance in the compression chamber:

a. the liquid being pressurized to such an extent that, at the moment of introduction, it has a steam pressure that is above the pressure that, at the moment of introduction, exists in the compression chamber (Column 2, Lines 50-67), and

b. the liquid being heated to such an extent that, at the moment of introduction, it has a temperature that exceeds the boiling point of the liquid for

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the temperature and the pressure that, at the moment of introduction, exists in the compression chamber (Column 2, Lines 50-67), and

c. the liquid being water, wherein the liquid is heated to such an extent that, at the moment of introduction it has a temperature that is below the temperature of the medium at the moment of introduction of the liquid (Column 2, Lines 50-67).

d. the medium being air

4. In re Claim 12, Jepsen discloses a system for controlling a device for the compression of a medium in the compression chamber of a combustion engine or a compressor, by which a liquid, in the state of a spray, is introduced into the compression chamber during a compression stroke, comprising means for pressurizing and heating said liquid and means for introducing the liquid into the compression chamber, and means for determining the pressure and/or the temperature in the compression chamber, characterized in that it comprises a control unit that is operatively connected with the means for determining the pressure and/or the temperature and with the means for pressurizing and heating the liquid, and including a computer program which is adapted for the purpose of controlling the means for the introduction of the liquid into the compression chamber upon basis of the information concerning the pressure and the temperature in the compression chamber and in accordance with the method according to anyone of Claim 1 (Column 2, Lines 50-68).

5. In re Claim 19, Jepsen discloses a system for controlling a device for the compression of a medium in the compression chamber of a combustion engine or a

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compressor, by which a liquid, in the state of a spray, is introduced into the compression chamber during a compression stroke, comprising:

- a. a device for pressurizing (Fig. 2, Item 57) and heating (Fig. 1, Item 16) said liquid;
  - b. a device for introducing the liquid into the compression chamber (Fig. 2, Item 57); and
  - c. a device for determining the pressure and/or the temperature in the compression chamber (Fig. 1, Item 21), wherein it comprises a control unit that is operatively connected with the device for determining the pressure and/or the temperature and with the device for pressurizing and heating the liquid, and including a computer program which is adapted for the purpose of controlling the device for the introduction of the liquid into the compression chamber upon basis of the information concerning the pressure and the temperature in the compression chamber and in accordance with the method according to claim 1 (Column 2, Lines 55-67).
6. Claim 1-5, 10, 12-14, 16, 18, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Binion (US Patent 5,718,194).
7. In re Claims 1-5, 10, 13, 14, 16, and 18, Binion discloses a method of compressing a medium in the combustion chamber of a combustion engine, comprising introducing a liquid, in the state of a spray, into the compression chamber during a compression stroke, and the liquid is pressurized and heated before it is introduced into

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the compression chamber to such a degree that at least a part of the droplets of the spray explode spontaneously upon entrance in the compression chamber:

- d. the liquid being pressurized to such an extent that, at the moment of introduction, it has a steam pressure that is above the pressure that, at the moment of introduction, exists in the compression chamber (Column 9, Lines 3-23), and
- e. the liquid being heated to such an extent that, at the moment of introduction, it has a temperature that exceeds the boiling point of the liquid for the temperature and the pressure that, at the moment of introduction, exists in the compression chamber (Column 9, Lines 3-23), and
- f. the liquid being water, wherein the liquid is heated to such an extent that, at the moment of introduction it has a temperature that is below the temperature of the medium at the moment of introduction of the liquid (Column 9, Lines 3-23).
- g. the medium being air

***Claim Rejections - 35 USC § 103***

- 8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jepsen in view of Tosa et al. (US Patent 5,170,751).
- 9. In re Claim 6, Jepsen does not disclose a combustion engine wherein the liquid is introduced through a valve that is used by the combustion engine for the purpose of introduction of fuel.

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10. However, Tosa et al. do disclose the above mentioned liquid/fuel combination valve (Column 1, Lines 49-51) for the purpose of achieving a more compact and practical design.

11. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have applied the liquid/fuel combination valve as disclosed by Tosa et al. to the combustion engine disclosed by Jepsen in order to achieve a more compact and practical design.

12. Claims 8-9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jepsen in view of Posselt (US Patent 5,992,353).

13. In re Claim 8, Jepsen does not disclose the compression method as disclosed in the claim.

14. However, Posselt discloses a method wherein a mixture of the previously compressed medium and the vaporized liquid is evacuated after the compression, and in that the liquid, after said evacuation, is separated by means of condensation (Column 3, Lines 53-55) in order to conserve water.

15. Thus it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the system disclosed by Jepsen with the condensation system disclosed by Posselt for conservation purposes.

16. In re Claim 9, Posselt discloses a method according to claim 8, characterized in that the liquid is refined from solid contamination and is re-transported to a suitable storing chamber (Column 3, Lines 53-58) in order to insure that solid contamination doesn't degrade the performance of the system.

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17. Claims 11 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jepsen (US Patent 4,322,950).

18. In re Claim 11, Jepsen discloses the claimed invention except for the introduction of water where the pressure is equal to or more than 4.5 bar. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to introduce the liquid at more than 4.5 bar, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

19. In re Claim 15, Jepsen discloses the claimed invention except for the temperature of the liquid being introduced into the compression chamber being below 250 C. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to introduce the liquid at below 250 C, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

20. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Binion in view of Tosa et al. (US Patent 5,170,751).

21. In re Claim 6, Binion does not disclose a combustion engine wherein the liquid is introduced through a valve that is used by the combustion engine for the purpose of introduction of fuel.



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22. However, Tosa et al. do disclose the above mentioned liquid/fuel combination valve (Column 1, Lines 49-51) for the purpose of achieving a more compact and practical design.

23. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have applied the liquid/fuel combination valve as disclosed by Tosa et al. to the combustion engine disclosed by Binion in order to achieve a more compact and practical design.

24. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Binion in view of Yuki et al. (US PG Pub 2004-0003781 A1).

25. In re Claim 7, Binion does not disclose a method according to claim 6, characterized in that the liquid and fuel are introduced simultaneously.

26. However, Yuki et al. disclose a method according to claim 6, characterized in that the liquid and fuel are introduced simultaneously (Paragraph [0051], Lines 1-7).

27. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have applied the simultaneous introduction as disclosed by Yuki et al in order to increase the mixing of injected water with fuel, decreasing NOx emissions.

28. Claims 8-9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Binion in view of Posselt (US Patent 5,992,353).

29. In re Claim 8, Binion does not disclose the compression method as disclosed in the claim.

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30. However, Posselt discloses a method wherein a mixture of the previously compressed medium and the vaporized liquid is evacuated after the compression, and in that the liquid, after said evacuation, is separated by means of condensation (Column 3, Lines 53-55) in order to conserve water.

31. Thus it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the system disclosed by Binion with the condensation system disclosed by Posselt for conservation purposes.

32. In re Claim 9, Posselt discloses a method according to claim 8, characterized in that the liquid is refined from solid contamination and is re-transported to a suitable storing chamber (Column 3, Lines 53-58) in order to insure that solid contamination doesn't degrade the performance of the system.

### ***Response to Arguments***

33. Applicant's arguments, see filed 09/29/2008, with respect to Yuki et al. have been fully considered and are persuasive. The rejection of claims 1-5, 7, and 10-14 as being anticipated by Yuki et al. has been withdrawn.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SIZO B. VILAKAZI whose telephone number is (571)270-3926. The examiner can normally be reached on M-F: 10:00am-5:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen K. Cronin can be reached on (571) 272-4536. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SIZO B VILAKAZI/  
Examiner, Art Unit 3747

/Stephen K. Cronin/  
Supervisory Patent Examiner, Art Unit 3747